DRAFT

SUMMARY OF HISTORIC DOCUMENTATION

UNITED SHOE MACHINERY
181 ELLIOTT STREET
BEVERLY, MA

PROJECT NO. 7051015.001

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1. Introduction

In response to Task Order R01015, Task 1.2, under EPA Contract No. EP-W-07-051, Mabbett & Associates, Inc. (M&A) has reviewed technical documents related to the former United Shoe Machinery Corporation (USM) facility in Beverly, Massachusetts. This review included site assessment reports, risk assessments, Response Action Outcome Statements, and Activity and Use Limitation documents listed in Attachment 1. A summary of the review is provided below.

2. Background

The USM facility was originally located at 181 Elliott Street in Beverly, Massachusetts. It contained approximately 90 acres of land located in the middle of a mixed commercial, industrial, residential area bounded to the south by the tidally influenced Bass River. Elliott Street runs through the property, separating the 80-acre northern property from a 10-acre southern section. Originally, USM owned more than the 90 acre property considered as the Site, up to a total of 150 acres. However no manufacturing activities were performed on the other portions of property and they were used for recreational or residential purposes only. Company housing and a golf course made up the majority of this additional land.

The earliest recorded usage of this property was in 1647, when a corn mill was built on a parcel in the southwestern corner of the Site. The mill operated at this location until 1872 when it reportedly burned down. USM was established by the merger of three machinery and shoe manufacturing firms in 1889. They then purchased the property on Elliot Street in 1902 and proceeded to develop the Site for their usage. Manufacturing operations began on the property in 1905.

The original manufacturing buildings were erected between 1902 and 1938; however a number of additional buildings were erected after this date. In total, 18 buildings were built and used for manufacturing, office space, and warehousing totaling approximately 1,380,000 square feet of operational space. Two of these buildings and the recreational yacht club were located on the southern portion of the property. The facility operated its own electrical cogeneration plant, utilizing steam turbines powered by coal and/or oil fired boilers.

Activities performed on-Site under USM represented typical metal working functions including drop forging, ferrous and non-ferrous founding, milling, drilling, heat treating, turning, shearing, stamping, welding, and painting. In 1970, USM began leasing portions of the facility to other companies. Over time, there had been a number of different tenants. USM was purchased by Emhart Corporation in 1976, and was then sold to Ablekind, Ltd. in 1987 who then moved manufacturing operations off-Site.

A Site Locus showing the location of the property is provided as Figure 1. A comprehensive Site Plan showing the current distribution of the Site is provided a Figure 2.

3. Site Hydrology

The Bass River is a tidally influenced tributary of the Danvers River, and is the discharge point for surface water at the USM site. Headwaters of the Bass River originate south of the Beverly Airport and flow southerly through wetlands and residential areas into the Golf Course, formerly owned by USM, and then into the 20-acre Upper Shoe Pond. Upper Shoe Pond drains through a sluiceway into Lower Shoe Pond, which drains over a dam and into the Bass River via an underground canal. The dam between Upper and Lower Shoe Pond separates the fresh waters of the upper Bass River Brook from the tidally-influenced portion of the lower Bass River Basin. Much of the USM site south of Elliott Street and east of the Drop Forge facility lies within the 100 year floodway boundary as established by the Federal Emergency Management Agency (FEMA).

Groundwater elevations were measured at the 44 monitoring wells installed at the USM site by Haley & Aldrich, Inc. In most instances, groundwater was encountered close to the ground surface, with depths ranging from 1.0 ft. to 10.0 ft. in site monitoring wells. The geology encountered in most subsurface explorations indicates that fill materials blanket a large area of the site, and that the fill is typically underlain by finer grained organic silts and clays. Generally the groundwater table is found above the fill/natural deposit boundary. Groundwater movement has been evaluated in some detail at the Ball Field, Area 2.8, the Drop Forge, and Boat Yard sites. At the Ball Field and Area 2.8, groundwater flow is generally from northwest to southeast, which is away from Upper Shoe Pond. This pattern suggests that the Upper Pond acts as a source of groundwater recharge for much of the site. Groundwater contours in the vicinity of the Drop Forge and Boat Yard indicate that a groundwater divide runs southeast to northwest between Elliott Street and the Bass River. To the north of the divide, groundwater is moving toward Elliott Street; and to the south, it is moving towards the Bass River.

4. Preliminary Investigations

Preliminary investigations into the state of the Site began in 1980s. These activities are documented in a report titled "Preliminary Oil and Hazardous Material Site Evaluation" submitted in June 1988. The original investigation divided the Site into 12 parcels where contamination was likely to appear, due to the historic usages of these locations:

Site No.	Site Name	Site No.	Site Name
1	Ponds (Upper and Lower)	7	Transformer Storage
2	Powerhouse	8	Modern Continental Yard
3	Area 2.8	9	Drop Forge Fuel Loss
4	Chip Grind Shed	10	Boat Yard
5	Hazardous Waste Storage Sheds	11	Balch Street Ball Field
6	Gas Station	12	Foundry

The investigation into these areas included test pitting, the advancement of soil borings and groundwater wells, and analytical sampling of surface water, groundwater, sediments, and soils. Additionally, an investigation into the underground storage tanks (USTs) used on-site was

performed as part of this operation. A total of 32 documented USTs were used for the storage of various oils and gasoline, as well as solvents.

A figure from the Preliminary Investigation showing this subdivision is provided as Figure 3.

A. Site No. 1: Shoe Pond (Upper and Lower)

Alterations were made to the original Mill Pond in order to provide a water reserve for on-Site needs during the initial development of the property in the early 1900s. The ponds encompass approximately 27-acres of the property, with a capacity of approximately 19 million gallons of water. The Upper Pond was originally used for non-potable water in the plant, boilers, non-contact cooling, toilets, etc. The Lower Pond supplied cooling water for the cogeneration plant and the fire pumps. The ponds were investigated as they receive discharge water from a number of locations including surface drains, and pesticides and fertilizers had been used in the past by USM for the maintenance of their grounds.

The original sediment and surface water samples from 1987 were analyzed for volatile organics (VOCs), semivolatile organics (SVOCs), base/neutral and acid extractable compounds, metals, petroleum hydrocarbons, pesticides, polychlorinated biphenyls (PCBs), and solids. Sediment samples from the Upper Pond showed detectable concentrations of petroleum hydrocarbons and trace metals. Sediments from the Lower Pond also showed concentrations of one SVOC, bis (2-ethylhexyl) phthalate, petroleum hydrocarbons and metals.

Surface water samples in the Upper Pond showed elevated concentrations of bis (2-ethylhexyl) phthalate and lead. One sample in the Lower Pond showed detectable concentrations of trichloroethane, but it was the only VOC detected in the area. Additionally, bis (2-ethylhexyl) phthalate was observed in some of the samples.

B. Site No. 2: Powerhouse

The Powerhouse, identified on the figures as former Building F, was a cogeneration plant which utilized primarily No. 6 fuel oil to generate steam for the facility. Small amounts of reusable lubricating oil were sent from the Chip Grinding Shed (Site No. 4) for fuel also. Four USTs were used to store oil in this area: two 15,000-gallon No. 6 fuel oil tanks, one 20,000-gallon No. 6 fuel oil tank, and one 500-gallon No. 2 fuel oil tank. An investigation was performed in 1987 on the three larger tanks, which were all found to be sound, however surficial soils in the area were noted to be oil-stained due to verbal evidence that the tanks had been overfilled on previous occasions, allowing the overflow to spill onto the ground.

Three test pits and one groundwater monitoring well were advanced in this area, and subsurface soil and groundwater samples were collected and analyzed for VOCs, base/neutral acid extractable compounds, metals, total petroleum hydrocarbons (TPH), and petroleum identification. Toluene was identified in soil one location at 10 ppb, and several SVOCs were identified, as well as silver at 22 ppm. TPH was identified in groundwater at 1.8 ppm.

C. Site No. 3: Area 2.8

Area 2.8 was located northeast of the dam and south of Building T. Historical research showed that this area was used for chemical storage, including drums of solvents, kerosene, thinners, lubricants, oils, and other materials.

In September 1986, a truck tank ruptured, causing a spill of diesel fuel in this area. Soil impacted by this release was excavated and stockpiled. During the excavation a distinct naphthalene odor was noted in and around the excavation area and naphthalene crystals could be seen in the stockpiled soils. An initial investigation of the area was performed which included 16 soil borings, eight test pits and seven groundwater wells which were installed in the area and sampled. Chemical analysis of the soils indicated the presence of VOCs, chlorinated solvents, naphthalene, SVOCs, petroleum hydrocarbons, and metals. Groundwater samples indicated the presence of chlorinated solvents and naphthalene.

A secondary evaluation was performed in September 1987 which included an additional ten test borings and 4 groundwater wells. Analytical results from the second investigation in soil showed the presence of VOCs, petroleum hydrocarbons and base/neutral compounds, with the most notable concentrations in the vicinity of the diesel release at the western portion of the site. Analysis of the groundwater indicated elevated concentrations of base/neutral compounds, including naphthalene, VOCs, and petroleum hydrocarbons.

D. Site No. 4: Chip Grind Shed

The Chip Grind Shed was used to grind metal parts into chips using a mechanical grinder. Chips were then transferred into a spinner where coolant oil was removed centrifugally. Next chips were transferred into a hopper where additional oil was allowed to drain. This oil was collected and pumped into an 8,500-gallon AST. Oil could either be circulated into the building for reuse, or burned in the powerhouse. This process apparently dripped oil onto the ground when chips were transferred into the hopper, as the ground around the area was oil stained. Historically, prior to the construction of the Chip Grind Shed in the 1940s, it was believed that chips were stored on the ground surface. In addition to petroleum related issues, sometimes cleaning solvents (chlorinated VOCs) were mixed into oil during various activities performed onsite.

A total of three test pits, five soil borings, and two monitoring wells were advanced in the Chip Grind Shed area in September 1987. The soil samples submitted for chemical analysis showed evidence of VOC and petroleum contamination. A groundwater sample indicated the presence of 1,1,1-trichloroethane at 300,000 ppb, and petroleum hydrocarbons at 1,200 ppb.

E. Site No. 5: Hazardous Waste Storage Sheds

Drummed waste was stored in the Chip Storage shed from 1980 through 1984. Additional drummed waste storage was located in the Hazardous Waste Storage Shed, which operated from 1984 through 1986. Up to ninety 55-gallon drums of waste were stored in these areas at a given time. These storage areas were closed following promulgation of Massachusetts Regulation 310 CMR 30.580 in 1987. This closure required testing of soil, groundwater, and shed structures.

This sampling and closure of the Sheds was performed after the initial investigation into the property was performed.

F. Site No. 6: Gas Station

USM owned and operated an on-site gasoline filling station for employees, located adjacent to the main entrance off of Elliott Street. The approximate dates of operation for this gasoline station were from the early 1920s through the late 1940s. There were six USTs used in connection with this operation, four oil tanks and two gasoline tanks. These tanks were all removed in July 1985, approximately 40 years after USM discontinued use of the filling station.

A total of five soil borings, three test pits, and two monitoring wells were advanced in this area in 1987. Soil samples from these locations submitted for laboratory analysis showed evidence of SVOC, VOC, and petroleum hydrocarbon contamination. Groundwater showed evidence of toluene (11 ppb) and petroleum (5.6 ppb), as well as metals.

G. Site No. 7: Transformer Storage

Former USM personnel indicated that an area located along the northeastern shore of Lower Shoe Pond was formerly used to store transformers. No documentation could be found to substantiate this claim, however due to the potential issues associated with transformer oils (petroleum hydrocarbons and PCBs), an investigation of this area was performed.

Two test pits were advanced in this area. No PCBs or identifiable oils or pesticides were detected during this investigation.

H. Site No. 8: Modern Continental Yard

Modern Continental Construction Co., Inc. (MCCC) rented property from USM from 1986 to 1987. They were one of many companies who rented portions of the property from USM for different usages. MCCC used the property to store heavy equipment used in the construction industry. Due to their on-site practices, the soils in this area became visibly contaminated with hydraulic oil.

MCCC undertook remediation activities in the area which involved removal of impacted soils from the area. During the initial investigation, oil impacted soils remained stockpiled on-Site.

I. Site No. 9: Drop Forge Fuel Loss

In 1908, a drop forge began operating on the 10-acre parcel south of Elliott Street. This area forged mechanical parts such as tools, blades, and chain cutters. This area included a wharf along the river that was eventually leased to the Bass Haven Yacht Club. USM began to cut back on forge operations in 1977, and discontinued usage entirely in 1984. During this time, the buildings and area were leased to other companies.

The forging operation was fueled by oil from two 10,000-gallon USTs. During a water main repair, free-floating product was discovered by USM less than 20 feet from the USTs. In 1985, approximately 235 cubic yards of oil impacted soils were excavated from between 4 to 10 feet below ground surface. Oil impacted water from the excavation was also removed.

Subsequent investigation to ensure the effectiveness of the initial cleanup was performed in 1986. Nine test pits, 17 soil borings, and 17 monitoring wells were installed. Petroleum impacted soils were noted in a number of the test pits and borings installed. The soils were found to contain petroleum products at levels from 780 ppm to 27,000 ppm in the four samples analyzed. The groundwater sampled at the five monitoring wells in the drop forge area were found to contain petroleum at concentrations of up to 110 ppm.

J. Site No. 10: Boat Yard

The Boat Yard is a 2-acre parcel south of the Drop Forge area that was originally operated by USM for employee boats. In 1969, this area was leased to the Bass Haven Yacht Club. The area was investigated due to its proximity to the Drop Forge oil release, and because of bottom paint scraping operations involved with boat maintenance.

Two soil borings, two groundwater wells, and nine test pits were installed in this area. A petroleum odor or sheen was noted in four locations. Concentrations of SVOCs, metals, petroleum products and pesticides were detected in soils in the area, with no detections of note in groundwater.

K. Site No. 11: Balch Street Ball Field

There was anecdotal evidence that the area may have been used for the disposal of a variety of manufacturing by-products, such as paints, laboratory chemicals, foundry sands, and pond dredging. Historic aerial photographs dated 1938, 1954, and 1969 confirmed that this area may have been used for disposal.

In order to determine if drums had been buried in this area, a ground penetrating radar (GPR) survey was performed, as well as the advancement of 11 soil borings, nine groundwater wells, and 14 test pits which were excavated at "target" locations identified during the GPR survey.

The test pits found various buried man-made objects (for example, metal grates, metal trays, concrete slabs) and demolition debris but did not identity any buried drums. Petroleum hydrocarbons, VOCs, and metals were identified in soil and groundwater in the area.

L. Site No. 12: Foundry

The Foundry was located in Building E since the early 1900s. Additionally, there was an area located west of the Foundry used for the storage of moldings and castings. The castings were made in sand molds containing foundry sand, which was periodically replaced for clean sand. Waste foundry sand was commonly used for fill material across the Site.

Four test pits were advanced in the area, which found a thick layer of fill containing brown/black/orange fine to medium sand with little coal, slag and bricks. Soils in the area showed no elevated VOC concentrations, but did show SVOCs, cadmium, and petroleum hydrocarbons.

5. Investigation Conclusions

The selection of these 12 sections of the USM property was based on historic activities and information. The investigation of these 12 potential areas of environmental concern concluded that contamination was present in nine of the areas. These areas were the Boat Yard, Gas Station, Chip Grinding Shed, Powerhouse, Foundry, Area 2.8, area north of Building T, Drop Forge, and Ball Field. The investigation report recommended that the Site be placed under the jurisdiction of the Massachusetts Oil and Hazardous Material Release Prevention Act, Chapter 21E (MassDEP), and that more investigation be done to further assess Site conditions.

6. Supplemental Investigations

In order to meet the requirements set for the Site by the MassDEP, additional investigations and remedial activities were performed.

A. Phase II and Phase III Investigations

The Phase II Investigation Report was submitted in 1991. The Phase II sub-divided the property into seven sectors, differently than the divisions set forth in the Initial Investigation:

Sector No.	Sector Name
Sector 1	Upper and Lower Shoe Ponds
Sector 2	Northern Area, Ball Field
Sector 3	Northeast Parking Area
Sector 4	Northern Buildings
Sector 5	Central Plant Facility
Sector 6	Main Entrance Parking Area
Sector 7	Southern Area

A figure from the Phase II report showing this subdivision is provided as Figure 4.

During the Phase II investigation, additional locations not addressed during the initial investigation were evaluated in order to address the nature and extent of the contamination on-Site. These areas included portions of Sector 2 which included areas adjacent to the Ball Field previously investigated. Sector 3 includes a parking lot and gymnasium used by the North Shore Regional Vocational School District (NSRVSD). This area had not been previously investigated as it did not have a known industrial or disposal use. Additional portions of Sector 4 were investigated, including the Hazardous Waste Sheds that were noted in the initial investigation, but not explored, including the Transformer Storage Area, and an area north of Building T which formerly contained five USTs for the storage of acetone and naptha. Sector 5 was considered the Central Plant Area, and included the main complex of buildings (including the Power House,

Chip Grind Shed, and Foundry). Sector 6 consisted of paved parking areas near the Site entrance, which included the Gas Station and West Parking Lot. Sector 7 is the southern parcel separated by Elliott Street, containing the Drop Forge and Boat Yard.

Subsurface explorations completed at the USM Facility as part of the Phase II activities consisted of 178 test borings, 139 observation wells, and 103 test pits. Sampled media include soil, sediment, surface soil, groundwater, and surface water which were analyzed for one or more of the following parameters: volatile organic compounds, acid and base/neutral extractable compounds, metals, pesticides, PCBs, total petroleum hydrocarbons, petroleum identification, nitrosamines, cyanide, fecal coliform, flash point, dioxin, polychlorinated dibenzofurans, and nitrate/nitrite.

Soil samples collected from across the USM Facility contained detectable concentrations of metals, base/neutral extractable compounds, volatile organic compounds, and total petroleum hydrocarbons, but at levels which were not considered to pose an immediate threat to health, safety, and public welfare. PCBs have been detected in only a limited number of soil samples and at maximum concentrations on the order of 1 ppm.

The majority of groundwater samples from across the facility contained no volatile organic compounds, no acid and base/neutral extractable compounds, and no PCBs. Groundwater typically contained a small number of contaminants such as metals and total petroleum hydrocarbons.

A human health Risk Assessment was performed as part of Phase II activities. This risk characterization indicated that for most of the Site, risk estimates were relatively low and below acceptable risk criteria for the MassDEP at that time. Primary areas with the highest levels of estimated risk were the Ball Field, Area 2.8, the Chip Grind Shed area, an area west of the Power House, an area west of the Foundry, and an area near the Drop Forge Building. The risk characterization concluded that when elevated risk levels were identified they were generally associated with “unrestricted site use” scenarios, which includes residential use of the property.

A Phase III Final Remedial Response Plan was submitted in August 1992. Copies of this report could not be located at the time of the File Review at MassDEP, nor were copies of it available on the on-line file viewer provided by MassDEP. References are made to the report in the 1995 Response Action Outcome Partial Statement.

The reference detailed the removal of contaminated soils from the saddle tank ruptures located in Sector 4. Diesel fuel had been spilled from delivery trucks on two separate locations east of Building L. These soils were excavated and removed from the Site. Additionally, petroleum contaminated soils were removed from around the Power House. All drums, tanks, and containers associated with the Chip Grind Shed and Hazardous Waste Storage Sheds were removed. The sheds were inspected, and MassDEP certified these locations as closed in March 1991.

A number of USTs were removed from the Site during Phase II and Phase III activities. Impacted soils noted during these UST removals were excavated, and impacted groundwater was

removed. An oil leak from a fuel line in the Power House was discovered during these activities. Oil from this leak was detected on the shore of the Bass River at an outfall of the covered channel with drains from the Lower Pond in 1989. The United States Coast Guard was notified and a boom was placed at the discharge point to prevent further contamination. It was determined that the leak originated in a boiler control line in the Power House, and oil which leaked from this line drained into a sump, which pumped into a storm drain which ultimately discharged into the Bass River. The leaking line was replaced, and impacted media were excavated and removed from the Site. Approximately 1,150 gallons of oil/water were pumped out of the sump, and oil from the rocks and sediments were removed from the site. Approximately 11.25 tons of oily solids were removed from the area in total.

The largest lessee on the property was the North Shore Regional Vocational School District (NSRVSD). The school had leased portions of Buildings A and B beginning in 1975. During these investigations, PCBs were detected in oils in the machine shop (in drums, in equipment, and on the floor). Testing indicated that PCBs found in the oils inside the machine shop had not migrated beyond that room, and had not been released to the environment.

The naphthalene detected in Area 2.8 was remediated using bio-remediation. A field bioremediation program (land farming) was recommended which involved regular applications of fertilizer and lime and roto-tilling a 1 ft. to 2 ft. thickness of contaminated fill materials. Fertilizers used included 10-50-0 nitrogen-phosphate-potash and ammonium nitrate-urea. Land farming was recommended in the Phase III study, with the alternative being cold mix asphalt batching.

Free product was noted in a number of locations across the Site during these investigations. The Chip Grind Shed and Power House both had measurable thickness of non-aqueous phase liquid (NAPL) present on the groundwater table. NAPL recovery in both of these areas was performed as part of Phase III activities.

A revised Risk Characterization for a "Restricted Site Use" scenario was performed as part of Phase III activities under the under the assumptions that 1) future development be consistent with the industrial or commercial history of the site; 2) uses associated with sensitive receptors or high risk of exposure, such as residences, public recreation (swimming and fishing), agriculture (gardening), schools, or child day care are prohibited; and 3) development requiring excavation is restricted in certain areas of the site was performed.

Under "Restricted Site Use" scenario, soil remediation by excavation and on-site cold-mix asphalt batching was recommended at selected locations on the site. Many of the areas of soil contamination targeted for remediation were paved or capped or located in areas of limited access. Given the types of contaminants detected at the site, in conjunction with their limited access and mobility, and site usage remaining industrial, the revised Risk Characterization concluded that the remaining contamination at the site does not constitute a substantial hazard under the Massachusetts Contingency Plan (MCP).

The Phase IV Final Inspection Report was submitted in October 1997, and documented that confirmatory sampling collected during soil remediation activities across the Site met the soil

remediation goals established by the MCP for non-residential use. Groundwater remediation was not considered to be necessary as existing groundwater concentrations were in compliance with MCP standards for non-drinking water.

B. Partial Response Action Outcome Statements

In 1995, Partial Response Action Outcome (RAO) Statements were submitted for the USM property. These reports divided the property into three sections: the North Parcel (the bulk of the facility, located north of Elliott Street), the Bass Haven Yacht Club/City of Beverly South Parcel, and the Retail Portion South Parcel. All three of the parcels were temporarily closed under Class C RAOs. A Class C RAO requires that the following criteria be met:

1. Oil and/or hazardous materials remaining at the site do not pose a substantial hazard.
2. Phase II Comprehensive Site Assessment and Phase III Evaluation of Remedial Action Alternatives have been completed in accordance with 310 CMR 40.0830 and 310 CMR 40.0850, respectively.
3. A plan is provided which presents definitive and enterprising steps to be taken toward achieving a Permanent Solution (310 CMR 40.0861(2)(h)).

At the time of the submission of the Class C RAOs, redevelopment plans for the North Parcel had not been finalized, and negotiations were in progress for sale of the North Parcel. Additionally, negotiations were in process for the sale and development of 12 acres fronting Elliott Street and McPherson Drive as a supermarket/retail center, with a public park bordering the shoreline at the mouth of the Bass River (Retail Portion South Parcel). The remaining section of the South Parcel was in negotiation to be conveyed to the Bass Haven Yacht Club (BHYC) for their continued use as a boat club, and the adjoining areas of Dock Lane and Draper's Point Landing were to be conveyed to the City of Beverly. However negotiations were still on-going for all of the parcels at the time of the submittal. It was decided that permanent RAO reports would be submitted once the parcels were under new ownership.

Additionally, the Partial RAO report for the North Parcel detailed that on-going land farming was still being performed in Area 2.8. While it had provided significant reductions in the presence of visible naphthalene crystals and odors, chemical analysis of soil samples collected from the land farm area still detect naphthalene, toluene, xylenes, and TPHs in excess of Upper Concentration Limits.

C. Final Closure Activities – North Parcel

In April 1996, the North Parcel was sold to Cummings Properties, and an Activity and Use Limitation (AUL) was placed on the North Parcel to prohibit future residential site use and limit site use to commercial and industrial uses, and to restrict the use of the on-site ponds, prohibiting recreational uses. Additional soil remediation occurred during this time frame. Activities included excavation and on-site cold mix batching at the locations identified in the Phase II Risk Assessment. Soil remediation occurred from October 1996 through July 1997, using remediation goals established for non-residential use. At the time, groundwater remediation was deemed unnecessary, as existing groundwater well concentrations were in compliance with MCP

standards, and the NAPL had been removed. These activities were completed and documented in a Phase IV Final Inspection report.

The North Parcel was then closed with a class B-2 RAO Statement submitted in October 1997. This RAO Statement also made amendments to the existing AUL in order to develop portions of existing Buildings A/B and former Building P for use as a day care facility, with indoor activities in Buildings A/B and an outdoor play area in a portion of former Building P. Under the original AUL, day care activities were prohibited. In order to accomplish this, a modification to the existing AUL was recorded in September 1997.

The modification recognized that there were existing subsurface soil conditions within the area of the proposed day care facility which exhibit soil contamination above the Method 1 soil standard for soil category S-1**.** In addition, VOC's were detected in groundwater samples from monitoring wells in the area of the proposed day care facility. In order to support the use of a day care and allow for the presence of children, a Method 3 risk analysis was performed to evaluate potential risks to children who may attend a day care center located within former Buildings A/B and at the location of the former Building P. This risk analysis documented that a "Level of No Significant Risk" exists at the proposed day care center.

D. Additional Amendments to the AUL

Between the original AUL submission in 1996 and the most recent amendment in 2008, the AUL has been amended five times to allow alternative uses at portions of the property that were not originally allowed under the AUL. The first amendment was included in the RAO submission. This amendment along with the subsequent amendments included allowing the use of indoor areas of all buildings for unrestricted use, and the use of certain outdoor areas for child day care play areas, and allowing light recreational use of the land area surrounding the Upper and Lower Shoe Ponds. With each amendment, additional site assessment work (including additional soil sampling, groundwater monitoring, and soil vapor studies) and/or a risk characterization was performed to document that the removal of the AUL restrictions would not result in a significant increase of risk. All of the amendments discussed that the original AUL was put into place under a conservative “worst case” scenario for potential receptors, and that the worst case scenario did not apply Site-wide due to the different uses of varying portions of the property.

In 2001, an AUL amendment with a Method 3 Risk Assessment was filed in support of the construction of the McKeown Elementary School located on a portion of the Site in the northwest corner designated as Lot A. This area of the Site was historically vacant land, and subsurface investigations indicated that it had not been used for fill materials. Soil sampling was performed and the data from this sampling was used in conjunction with the data collected during the initial investigation and the Phase II in order to determine that a level of No Significant Risk to human health existed for the use of the area as an elementary school.

Additionally in 2001 soil sampling was performed in support of a proposed recreational walkway and landscaped areas around the Shoe Ponds. While this recreational use of the area was not permitted under the original AUL, it was determined through soil sampling that use of the area for recreational purposes represented a level of No Significant Risk.

In 2003, a soil vapor survey was performed around a specific section of the Cummings property in order to determine if the property could be used for a special education facility for middle school aged children. The results of the survey showed that VOCs were not detected and a potential indoor air pathway was not identified in the area.

In 2006, an amendment was submitted to allow for a portion of the property between buildings 500 and 600 to be used as an educational and/or daycare facility including an outdoor play area. This investigation included the collection of soil samples and soil gas sampling which showed that these activities could be allowed provided soils below three feet from the existing surface grade were not disturbed.

The most recent modification to the AUL completed in October 2008 included soil vapor testing along the exterior of the on-site buildings in order to determine if vapor intrusion due to residual contamination was present. The conclusion of this soil gas testing was that there was no substantial vapor intrusion into the buildings, and therefore indicated that the on-site buildings should have unrestricted use, provided they did not disturb subsurface soils.

E. Final Closure Activities – Bass Haven Yacht Club/City of Beverly South Parcel

A Class C RAO Statement was submitted for the Bass Haven Yacht Club (BHYC) and Drapers Landing portions of the South Parcel in July 1995. This report detailed that while evidence existed to close the Parcel under a Class B RAO (No Remedial Action required) with an AUL, there was still ownership issues to be worked out in the parcel, and that once the ownership were completed, final RAOs were to be submitted.

The area that had been leased by BHYC for their boat club was conveyed to them for continued use, and the adjoining areas of Dock Lane and Draper's Point Landing were conveyed to the City of Beverly. These sub-parcels were designed to maintain permanent public street access to the Bass River.

Once final ownership was transferred, a Class B-2 RAO Statement was submitted in April 1996 for the Bass Haven Yacht Club. This submittal included an AUL limiting the future use of the property. Based on a Risk Characterization performed at the property, a level of no risk of harm under a "Restricted Site Use" scenario was identified at the BHYC/City of Beverly Portion of the South Parcel. Accordingly, no remediation was performed.

A Class B-1 RAO Statement was submitted in November 1997 for Drapers Landing portion of the South Parcel, owned by the City of Beverly. Drapers Landing consists of 1.5 acres of land. The land was conveyed to the City of Beverly, which includes 1.1 acres of continuous tidal flats of the Bass River. These flats are not considered part of the disposal site subject to the MCP and are not covered by the RAO. The parcel of the property covered by this RAO is 0.4 acres of uplands at the southern limits of the South Parcel. No buildings exist on or in close proximity to this property.

Soil analysis at this parcel detected low levels of several PAHs (phenanthrene, fluoranthene, pyrene, benzo(a)anthracene and chrysene) commonly associated with products of combustion, various metals consistent with USM site background, and low TPH levels (190 ppm). VOCs and pesticides/PCBs were not detected in soils. Groundwater analyses indicated similar results with TPH detected at 20 ppm. The PAHs detected at Draper's Landing were considered more likely related to products of combustion, such as commonly found in coal ash and cinders which were not reportable at the time.

F. Final Closure Activities – Retail Portion South Parcel

A Class C RAO Statement was submitted for the Retail Portion of the South Parcel in July 1995. At the Retail Portion of the South Parcel, elevated TPH levels were found in soil and groundwater east of the Drop Forge building, apparently due to a historical fuel oil release involving the mistaken delivery of 10,000 gallons of fuel oil into an electrical manhole. Evidence of petroleum contamination was also noted in a separate area near the old saw mill (lumber shed). Under the risk-based "Restricted Site Use" scenario, remediation was not judged necessary within the Retail Portion of the South Parcel. However, remediation of the petroleum contaminated soils on the east side of the drop forge (source area) was recommended as part of future site development.

In March 1996, Mass DEP received a transmittal which transferred responsibility for conducting response actions at this parcel to Stop & Shop Supermarket Company (Stop & Shop). Stop & Shop then undertook Phase IV Comprehensive Remedial Response Actions at the parcel which included the excavation of approximately 7,500 cubic yards of petroleum contaminated soils which were cold-mix asphalt batched and re-used onsite. An additional 5,565 cubic yards of excess “urban” fill and topsoil were excavated and transported offsite. Approximately 6,430 gallons of oily liquids were removed, 15 yards of TCLP lead contaminated soils, and 31,695 cubic yards of organic silt and peat were also disposed of offsite.

A Class A-3 RAO Statement was submitted for the parcel in October 1997 along with an AUL. The AUL was considered necessary to maintain a condition of "No Significant Risk" at the disposal site and detailed that the site remains for commercial and industrial purposes only.

7. Data Gaps

The following gaps in the available data were noted based on a site inspection performed by M&A and EPA personnel as well as a review of available information from MassDEP and current property owners.

A. Site Walk

During the EPA site walk, what appeared to be melted slag and construction debris was noted along the river front immediately to the west of the BRYC. Little to no mention of the discovery of this material was made in the reports viewed for the Southern Parcel.

Site geology in the vicinity of the Yacht Club was documented as consisting of surficial fill consisting of dark brown fine sand, or black cinders, included little silt, trace amounts of gravel, slag, brick and wood ranging from 2.7 ft. to over 12.0 ft. in thickness across the site. In several areas a light brown clayey silt classified as fill was found subjacent to the dark brown fine sand and cinders. A dark gray to gray organic silt or silty clay was generally encountered beneath the fill material across the site. Below the organic silt a yellow to blue clay was encountered at depths of 7.0 to 16.5 ft.

Site geology in the vicinity of the Drop Forge (Retail Section of the South Parcel) was documented as consisting of fill deposits varying from 2 to 11 ft. in depth, consisting of black to brown cinders, with trace amounts of sand, gravel, brick, pipe, metal and concrete. In some subsurface explorations a second brown silt or black clay was encountered below the cinders. In most instances blue clay was encountered below the fill. Where the clay is absent the fill material directly overlies a brown peat. Peat was also encountered below the blue clay.

While some mention of slag and brick were mentioned, it was considered to be "trace amounts", whereas there were significant amounts of this material noted just below the surface adjacent to the property during the site walk. It is unclear if this material is a result of onsite operations.

B. Phase III / Phase IV / Status Reports

Copies of the Phase III and the Phase IV reports for the Northern Parcel were not available at MassDEP, or via their on-line file review system. Therefore only references made to these reports and summaries of available information from the 1995 RAO reports were included in this summary. Specific activities performed which were not fully documented are itemized in more detail below.

C. Documentation of Remedial Actions

The available historical documentation provides a summary of the remedial actions that have taken place in multiple sectors, but do not always provide the documentation that contaminants were reduced to acceptable levels.

Remedial actions conducted in Sector 4 include:

- Removal of contaminated soils from Saddle Tank ruptures east of Building L
- Removal of contaminated materials and the closure of the Hazardous Waste Storage Shed and Chip Storage Shed (Sector 5)
- Landfarming activities at Area 2.8

Remedial actions conducted in Sector 5 include:

- No. 6 fuel oil spills (February 4, 1986; March 4, 1986; May 7, 1986; and December 30, 1987)
- Fuel oil release to the Bass River (December 6, 1989)
- Machine oil release (February 1988)

- Free product recovery in the Chip Grind Shed and Power House areas

Remedial actions conducted across the Site include:

- Removal of contaminated media during plant decommissioning
- Documentation on the removal and/or closure of various underground storage tanks.

If the property owner cannot provide additional documentation of these remedial actions and subsequent confirmatory sampling, additional data may be required to confirm the remedial actions were effective.

8. Conclusions

Various portions of the facility are subject to use restrictions (Activity and Use Limitations; AULs) which limited certain activities and uses in order to maintain a condition of no significant risk to human health. The AULs were modified from time to time to allow new uses of portions of the facility that were prohibited by previous AULs.

In the Phase II investigation, the facility was divided into seven sectors. The data collected at the United Shoe Manufacturing facility during as part of Phase II activities were organized and presented by sector. The current status of each sector within the facility is summarized below.

Sector 1 – Upper and Lower Shoe Ponds

The Upper and Lower Shoe Ponds were investigated during the Preliminary Site investigation, and were covered under the original Risk Assessment and 1995 RAO submittal. Since detectable concentrations of contaminants were found in soil and water around the area, recreational activities were not permitted in this area. In 2001, additional soil sampling was performed along the banks of the ponds in advance of the construction of a walking path and landscaped areas for public recreation. The ponds are behind a fence with signs, limiting recreational access to the water bodies in accordance with the AUL. It does not appear that ecological risk activities were performed.

Sector 2 – Northern Area, Ball Field

A portion of this area was subdivided into Lot A (the McKeown Elementary School). In 2001 an AUL amendment with a Method 3 Risk Characterization was performed for the Lot A portion. Documentation on remedial activities performed on the remaining portion of the sector, labeled as the “ball field,” were performed during Phase III / Phase IV and were not available for review.

Sector 3 - Northeast Parking Area

This area was not sampled during the initial investigation, as historically no industrial activities were performed. Phase II sampling activities were performed, and the Phase II report provided documentation on a June 1983 small quantity (between 15 and 30 gallon) hydraulic oil release to

a storm drain, which was remediated. Use of Sector 3 is consistent with the AUL for the Northern Parcel.

Sector 4 - Northern Buildings

The land farming performed to remediate Area 2.8 was referenced in a number of documents, however the status reports submitted were not available for review. The 1995 and 1997 RAO state that contamination in the area was remediated by these activities, but do not provide copies of the analytical documentation.

Sector 5 – Central Plant Facility

This area includes the Powerhouse, Foundry, Chip Grind Shed, and product recovery activities, which were identified in the Phase II as areas of concern. Documentation on the remedial activities performed in these various locations was not available for review, however the RAO submittal references these documents and indicates that activities were performed in accordance with the MCP and remediation goals were achieved at these locations.

Sector 6 – Central Plant Facility

This sector includes the former gasoline station, which was investigated as Site No. 6 during the Initial investigation. Data collected during the investigation was used in the site-wide risk assessment, and current activities in this area are consistent with the original AUL for the Northern Parcel.

Sector 7 – Southern Area

This sector consists of three separate subdivisions: Retail portion, BHYC, and Drapers Landing. Each of these sections has a separate owner, and different remedial activities were performed after the submittal of the 1995 RAO C.

Additional remediation of the Retail portion of this area was performed by the new property owners after the submittal of the 1995 RAO C. Copies of the Phase IV for this portion of the Site were available for review. Contaminated materials from this area were excavated and remediated prior to the construction of the retail buildings. Use of the parcel is consistent with the AUL for this portion of the facility, which permits commercial/industrial use.

Current Site usage is in accordance with the 1997 RAO submitted for the BHYC, detailing that a level of no harm existed under a Restricted Site Use scenario as outlined by the AUL for this parcel. Therefore, no remediation was performed in this area as site usage was not changing.

Drapers Landing consists of approximately 1.5 acres of land, and 1.1 of these acres is considered to be continuous tidal flats of the Bass River. These flats were not considered to be part of the MassDEP Site, and no remedial investigation has been performed in that area.

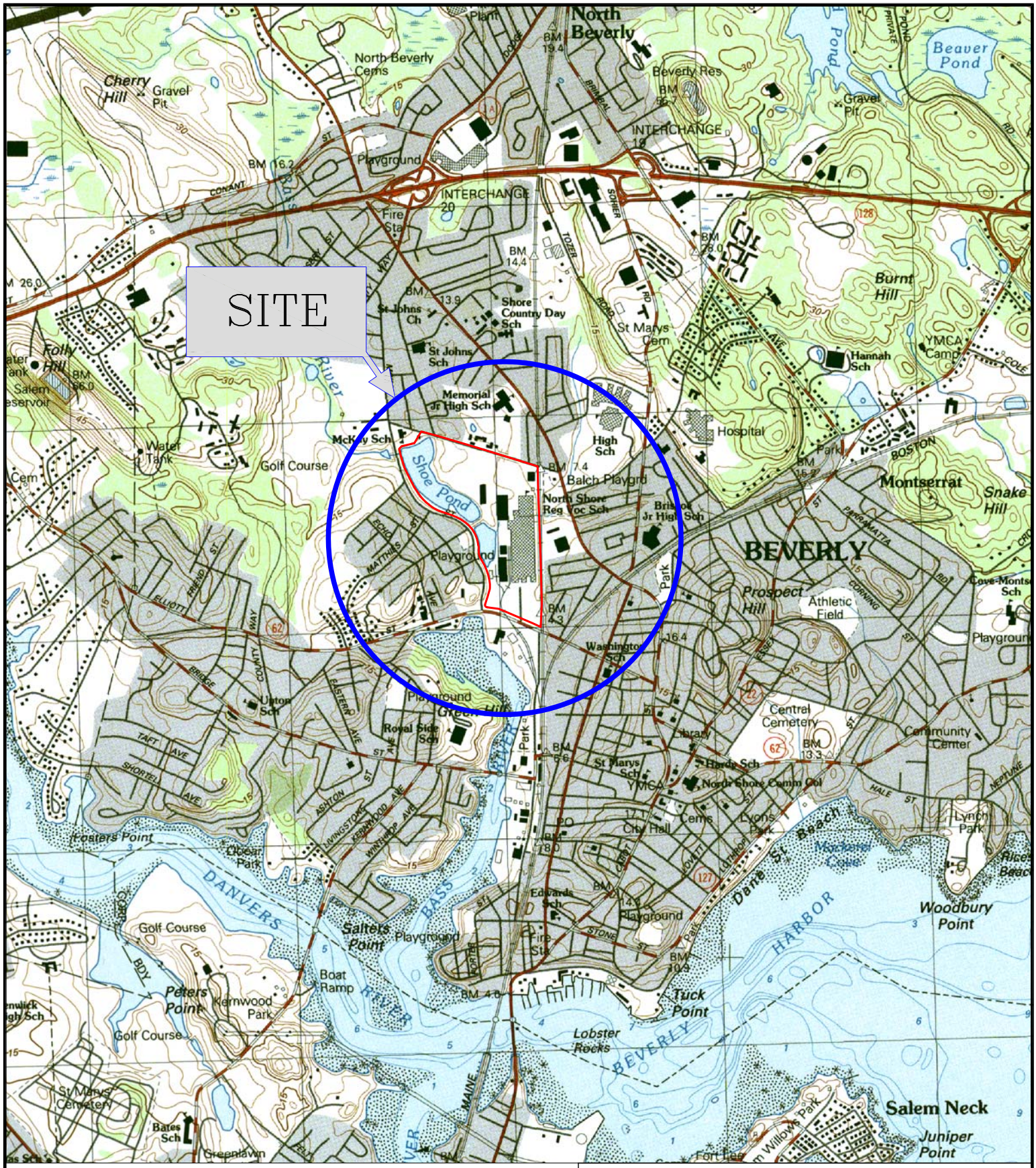
Additionally, no ecological risk appears to have been performed on the areas of the property adjacent to the Bass River.

9. References

Document Date	Title	Author
1988 June 10	Report on Preliminary Oil and Hazardous Material Site Evaluation United Shoe Machine Facility	Haley & Aldrich, Inc.
1988 June 10	Report on Preliminary Oil and Hazardous Material Site Evaluation United Shoe Machine Facility (copy 2)?	Haley & Aldrich, Inc.
1991 February 14	Report on Oil Spill Investigation Modern Continental Construction Company- USM Facility – Beverly, MA	Haley & Aldrich, Inc.
1991 June	Phase II – Comprehensive Site Assessment United shoe Machinery (USM) Facility	Haley & Aldrich, Inc.
1994 November 14	Beverly, RTN 3-0610 USM Facility, 181 Elliot Street Expired Waiver, Request for Tier II Extension, Status Report Review - Memorandum	Edward J. Weable, Env. Geologist, SARSS Contractor, PEER Consultants, P.G.
1995 April 25	DEP File Nos. 5-481 and 5-482 Proposed Redevelopment of USM South Parcel and Bass Haven Yacht Club	Vanasse Hangen Brustlin, Inc.
1995 July 31	Response Action Outcome Statement Bass Haven Yacht Club/City of Beverly Portion South Parcel	Haley & Aldrich, Inc.
1995 July 31	Response Action Outcome Statement North Parcel United Shoe Machinery (USM) Facility	Haley & Aldrich, Inc.
1995 July 31	Response Action Outcome-Partial Statement Retail Portion – South Parcel	Haley & Aldrich, Inc.
1995 August	United Shoe Machinery South Parcel Development – Final Environmental Impact Report Beverly, MA	Vanasse Hangen Brustlin, Inc.
1997 March 14	Former USM Property Notice of Responsibility Request for Information	Haley & Aldrich, Inc.
1997 October 7	Facility Detail Report from EPA.gov	web
1997 October 15	Cummings Center – Former USM Property Response to Notice of Audit Findings	McCulley, Frick & Gilman, Inc.
1997 October 28	Partial Response Action Outcome Statement and Modification – Former United Shoe Machinery	McCulley, Frick & Gilman, Inc.
1997 October 29	Class A-3 Response Action Outcome – Partial Statement, North Parcel RTN-3-0000610	Haley & Aldrich, Inc.
1997 October 30	Letter of Transmittal – Former USM Facility – South Parcel – Retail Portion (enclosures)	Haley & Aldrich, Inc.

Document Date	Title	Author
1997 October 30	Response Action Outcome – Former USM Facility – South Parcel – Retail Portion	Haley & Aldrich, Inc.
1997 October 30	Response Action Outcome Statement Former Fuel Oil Underground Storage Tanks, Building 900 Cummings Center, Beverly, MA	McCulley, Frick & Gilman, Inc.
1997 November 6	Class B-1 Response Action Outcome – Partial Statement Drapers Landing Portion – South Parcel	Haley & Aldrich, Inc.
1997 December 16	Response Action Outcome Mercury Impacted Soils, Cummings Center, Beverly, MA	McCulley, Frick & Gilman, Inc.
1998 January 15	Response Action Outcome Letter indicating RAO filed with DEP	McCulley, Frick & Gilman, Inc.
2001 August 27	Waterways License No. 8526 Letter from DEP to Bruce Oveson of Cummings Properties With Enclosure Letter from Green Environmental RE: AUL Opinion – Proposed Public Walkway	DEP
2001 September12	Method 3 Human Health Risk Characterization Lot A 70 Balch Street Beverly, MA	Haley & Aldrich, Inc.
2003 July 9	Report on Soil Vapor Survey Results Suite 130Q – 100 Cummings Center Former United Shoe Machinery Facility	Haley & Aldrich, Inc.
2003 July 10	Partial Termination of Notice of Activity and Use Limitation	Haley & Aldrich, Inc.
2004 November 15	Deadline Extension Re: Beverly-181 Elliott Street RTN 3-00610 Southern Parcel	Letter from DEP
2006 August 11	Amendment to Activities and Use Limitation	Kleinfelder
2008 October 16	5th Amendment to Activities and Use Limitation	Kleinfelder

FIGURES



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UNITED SHOE MACHINERY

BEVERLY, MASSACHUSETTS

Mabbett & Associates
Environmental Consultants & Engineers

SITE LOCUS MAP

DWG. NO. 1

DRAWN PAL	APPROVED	SCALE 1= 2000	PROJ. NO.

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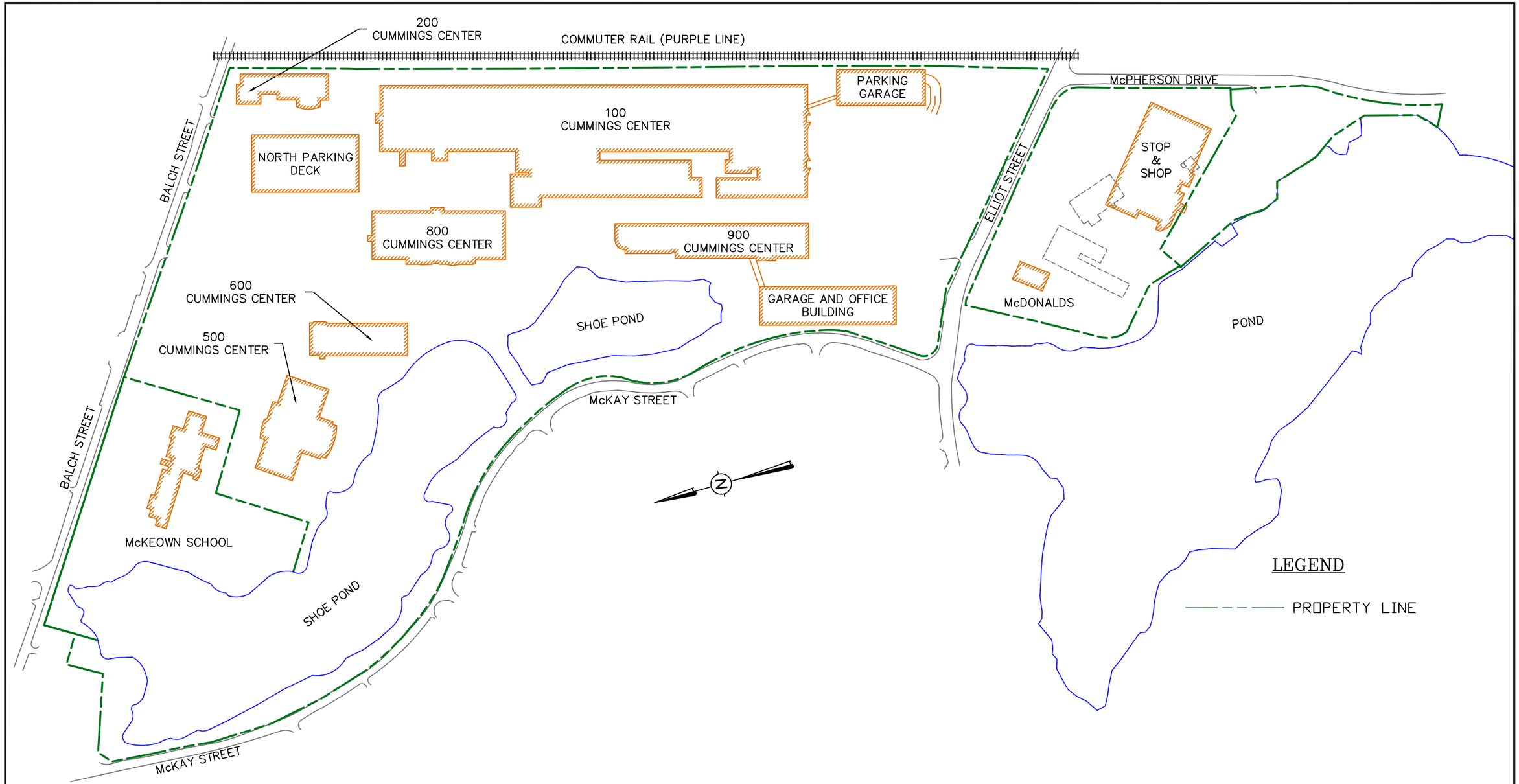

NOTE:

ALL LOCATIONS ARE APPROXIMATE

SCALE:

0 300 600

APPROXIMATE SCALE IN FEET

NO.	DATE	DESCRIPTION	DRN	CHK	APP
A	2/1/2010				

REVISION

UNITED SHOE MACHINERY

BEVERLY, MASSACHUSETTS

Mabbett & Associates
Environmental Consultants & Engineers

SITE PLAN

DWG. NO. L 2

DRAWN PAL | APPROVED | SCALE | PROJ. NO. 7051015.001

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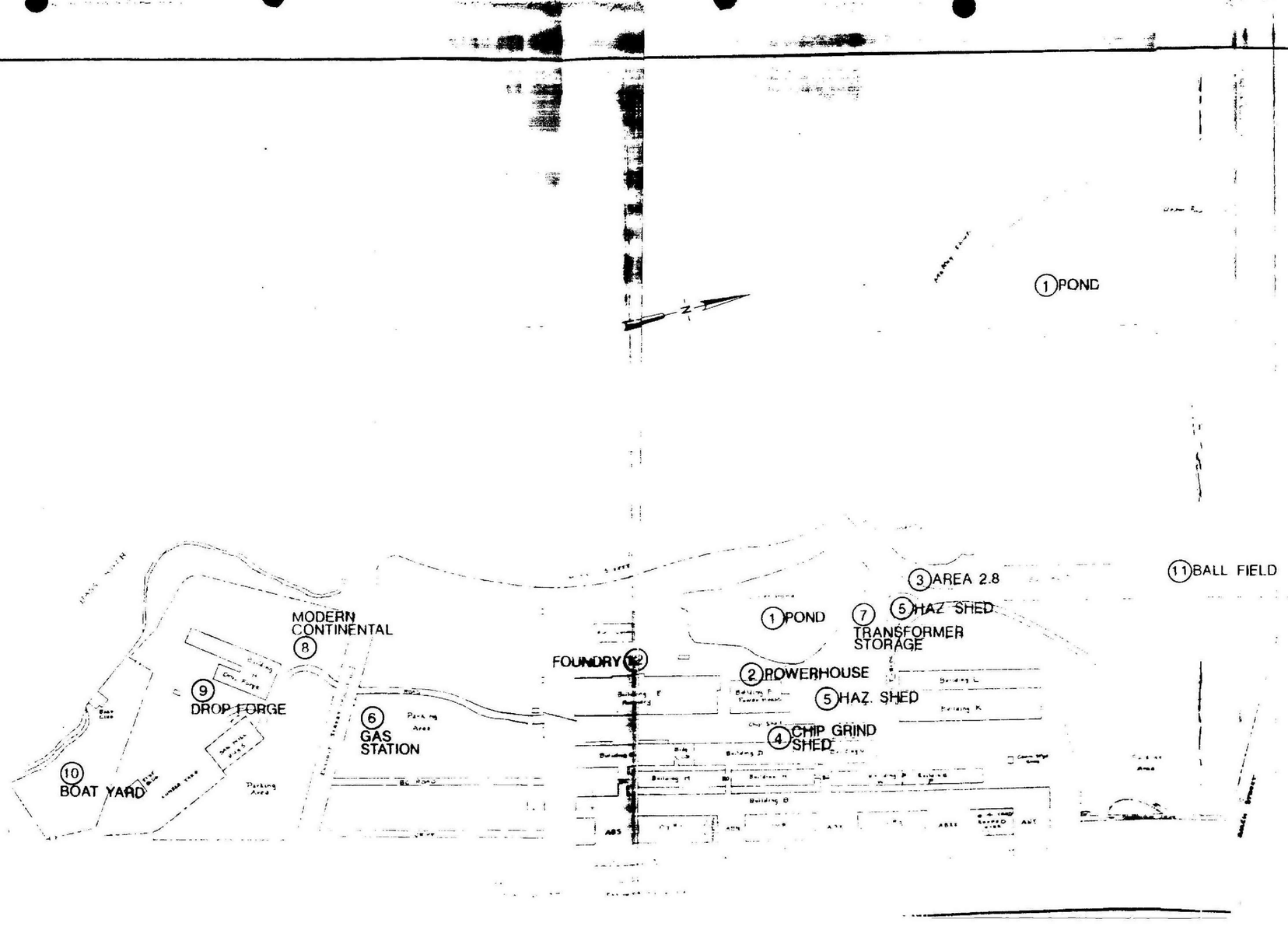


LEGEND:

(1) NUMBER INSIDE CIRCLE REFERS TO SITE DESIGNATION FOR AREA 1 - 12 ON TABLE 3 OF REPORT.

Haley & Aldrich, Inc.

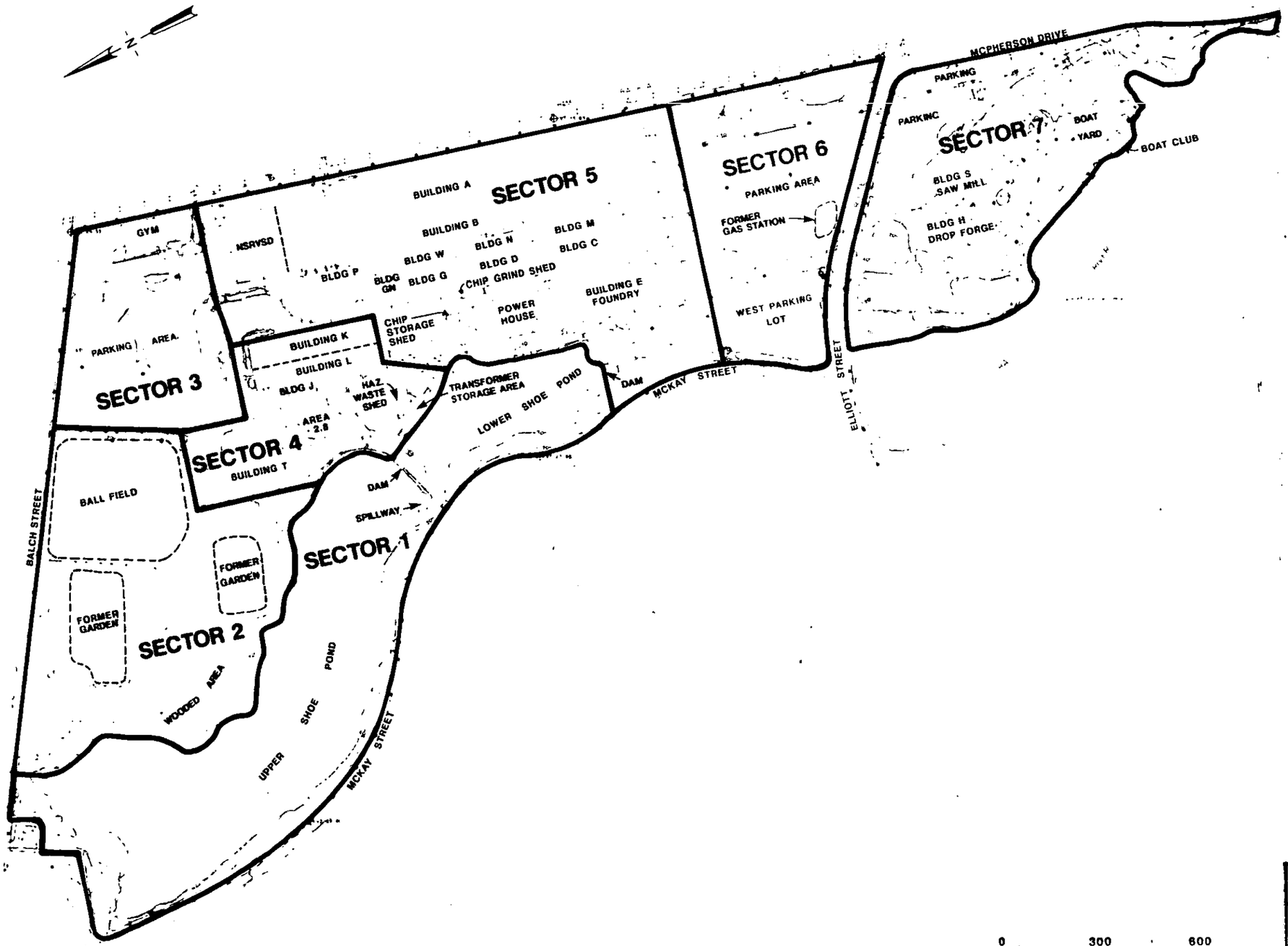
PRELIMINARY OIL & HAZARDOUS MATERIAL SITE EVALUATION
UNITED SHOE MACHINERY CORPORATION
BEVERLY, MASSACHUSETTS

LOCATIONS OF IDENTIFIED SITES

SCALE NONE

FEBRUARY 1988

FILE NO. 6376 00 B3



LEGEND:

SECTOR BOUNDARY

NOTES:

1. BASE PLAN OBTAINED FROM EASTERN TOPOGRAPHICS.
2. NSRVSD IS THE ABBREVIATION FOR NORTH SHORE REGIONAL VOCATIONAL SCHOOL DISTRICT.

0 300 600

SCALE IN FEET

Haley & Aldrich, Inc.
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

UNITED SHOE MACHINERY FACILITY
PHASE II/EIR
BEVERLY, MASSACHUSETTS

SITE PLAN DIVIDED ACCORDING TO SECTORS

SCALE: AS SHOWN

JUNE 1991

FILE NO.06376-07 B102

FIGURE 4